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B241 Facility Screening Report (SCR)

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LLNL Facility Screening Report (SCR) for B241

Facility Name

Lead Preparer: Mark Johnson	Date Performed: 12/19/2006

Facility Description

B241 provides facilities for biological and chemical laboratory operations. It is located in the southwest quadrant inside the 1 square mile boundary of Lawrence Livermore National Laboratory. The facility is approximately 655 meter from the nearest site boundary along East Avenue.

B241 was built in 1960 and has reinforced concrete tilt-up construction with protected metal columns, beams, and roof. The ground floor of the building covers around 53,935 square feet and the mezzanine covers about 7,910 square feet. The mezzanine houses the building's mechanical room.

There are three large cryogenic tanks, each with a capacity of ~1000 gallons, located outside on the south side of the building. One of these tanks contains liquid nitrogen and is managed by the B243 facility. The remaining two cryogenic tanks are empty.

Two automatic generators are located outside of the southwest corner of the facility and provide power to some of the emergency lighting fixtures located on the personnel thoroughfare. Battery-powered light-packs provide emergency lighting in other areas.

With the exception of room 1858A which is used for lithium storage, all the laboratory and office spaces have automatic sprinkler system installed.

Per Seismic Evaluation Report for Compliance with Executive Order 12941, Lawrence Livermore National Laboratory (Degenkolb, JN 96240.00, 10/1998) and Seismic Mitigation Study, Lawrence Livermore National Laboratory (Degenkolb JN A20047.11, 3/24/2004) the B241 structure does not currently meet PC-1 seismic standards. Operations are limited to Light Science & Industry or below.

Define facility type:	**Owner Organization:**
Check: ☒ Single Structure or Area: (B/Tr/A) B241 ☐ Complex of Buildings: Designation _____ ☐ Segment* of Bldg or Complex: _____ Seg.# _____ *Attach justification for segmentation	Directorate: Chemistry, Material, and Life Sciences Facility AD: Thomas Diaz de la Rubia

Final Facility Classification: (Check)

☒ LSI ☐ Low ☐ Moderate ☐ High ☐ Nuclear Facility ☐ Accelerator

Concurrence Signatures for Facility Classified as LSI:**

Lead Preparer : _____ Date: 3/12/2007

AB Section Leader or designee: C.M. Van Wyngarden Date: 3/12/2007

ES&H Team Leader or designee: Tracey A. Simpson	Date: 3-13-07
Approval Signature for Facility Classified as LSI:** Facility Management: [signature]	Date: 3/14/07

Supporting Documentation Appended	**Comments:**
Check as appropriate: ☐ Justification for Segmentation ☐ Chemical Hazard List ☒ Radiological Hazard List ☐ Explosive Hazard List ☒ Building Layout ** Signatures are not required on this form for facilities classified as Low, Moderate or High. Approval signatures for these are on the cover of the Tier 2 or Tier 3 SBDs.	

Identification of Operations, Inventories, and Hazards

The CMLS Directorate administers B241 and personnel from several LLNL line organizations performing work within the facility. B241 is also the home office of Hazard Control Team Two.

Primary activities conducted by researchers within the building include:
- Packaging and low level manipulation of uranium,
- Corrosion and environmental stress testing of metals, soil and ground water testing,
- Biodegradation studies and restoration activities,
- Viral sequencing, environmental sensor testing for soil, water, and air samples,
- Biological agent field lab development and training.

A vault in room 1858A contains lithium, low level radiation sources and beryllium.

Minor levels of legacy beryllium residue may remain within some facility exhaust ducting and may be present within some closed-off high/low bay trenches.

B241 has electronics and machine shops supporting other programs in addition to building residents.

Did Facility Management receive any notifications of credible external threats from nearby facilities? yes ☐ no ☒

If yes, list the following for each notification:

Source Facility:	Facility Contact(s):	Phone # (s):
n/a	n/a	n/a

Describe Hazard(s):
n/a

Hazard Identification Table

Check the hazard types found in the facility.

Not Found	Found		
☐	☒	Biological Hazards	Complete block I, below

☐	☒	Chemical Hazards	Complete block II, below
☒	☐	Explosive Hazards	Complete block III, below
☐	☒	Radiological Hazards	Complete block IV, below
☐	☒	Industrial Hazards	Complete block V, below

I. Biological Hazards

Check BioHazard Type

☒ **Non-Select Agents**

Check highest group in facility:

- ☐ RG1 Agents
- ☒ RG2 Agents
- ☐ RG3 Agents

☐ **Select Agents**

Select highest group in facility:

- ☐ RG1 Agents
- ☐ RG2 Agents
- ☐ RG3 Agents

☒ Other BioHazards (e.g., Blood, nucleic acid, lab animals, contaminated needles/sharps, animal/human tissues)

Biological Safety Level (BSL)

Check highest level in facility:

☐ N/A ☐ BSL-1 ☒ BSL-2 ☐ BSL-3

II. Chemical Hazards

Check ChemHazard Type

- ☒ Flammable, volatile or fuming
- ☒ Toxic materials (acutely toxic, toxic, systemic toxin, toxic gases)
- ☒ Corrosives/irritants
- ☒ Reactive materials (e.g., air/water sensitive; pyrophoric; thermally, shock, or friction sensitive; perchlorate)
- ☒ Carcinogens, mutagens, reproductive hazards
- ☐ Pesticides
- ☒ Beryllium
- ☒ Materials of special concern (e.g., alkali metals, fluorine, asbestos, lead, mercury, PCB)
- ☒ Other regulated metals (e.g., chromium, copper, nickel, zinc)
- ☐ Other:_____

Do any chemicals exceed LSI classification?

☐ YES ☒ NO

For chemicals that exceed LSI classification, attach maximally planned chemical inventory listing.

III. Explosive Hazards

Check

- ☐ Primary High Explosives
- ☐ Secondary High Explosives
- ☐ Propellants/Low Explosives
- ☐ Firearms Ammunition

Do any of the explosive types checked above have any of the following associated hazards?

- ☐ Fragmentation Hazards (Primary Fragments)
- ☐ Group L Explosives

Attach maximally planned inventory listing for each explosive type checked.

IV. Radiological Hazards

Check Sum of Ratio

- ☒ <1 of RQ thresholds (40 CFR 302.4 Appendix B)
- ☐ >1 of RQ thresholds < Cat. 3 Thresholds (DOE-STD-1027-92, Table A.1)
- ☐ >Cat. 3 Thresholds (DOE-STD-1027-92, Table A.1) < Cat. 2 Thresholds (DOE-STD-1027-92, Table A.1)

Does facility contain the following?

Radiation Generating Devices:

- ☐ Radiation generating devices not covered by DOE O 420.2A (e.g., X-rays, Electron Beams, Radiography Equipment): class _____
- ☐ Radiation generating devices covered by DOE O 420.2A (Accelerators).

Exempted materials:

- ☐ Radioactive Certified Sealed Sources
- ☐ Rad. In Type B Containers with current certificates of compliance
- ☐ Either in quantities>Cat. 3 thresholds (DOE-STD-1027-92, Table A.1)

Attach listing of maximally planned radiological

	materials inventory.

V. Industrial Hazards

Check if hazard present	Industrial Hazard	Examples of industrial hazard(s) for each general category. (Select Industrial Hazards found.)	List industrial hazard(s) that could directly impact the public (fence-line) or colocated worker (100 m).
☒	Electrical	☒ Battery banks, ☒ Cable runs, ☒ Diesel generators, ☒ Electrical equipment, ☒ Heaters, ☐ High voltage (> 600V), ☒ Motors, ☒ Power tools, ☒ Pumps, ☐ Service outlets, ☐ Fittings, ☒ Switchgear, ☒ Transformers, ☒ Capacitors, ☐ Magnetic fields, ☐ Transmission lines, ☒ Wiring/underground wiring, ☐ Other:_____.	
☒	Thermal	☒ Boilers, ☒ Bunsen burner/hot plates, ☒ Electrical equipment, ☒ Electrical wiring, ☒ Engine exhaust, ☒ Furnaces, ☒ Heaters, ☒ Lasers, ☐ Steam lines, ☒ Welding surfaces, ☒ Welding torch, ☐ other:_____	
☒	Kinetic	☒ Acceleration/deceleration, ☒ Bearings, ☒ Belts, ☒ Carts/dollies, ☒ Centrifuges, ☒ Crane loads (in motion), ☒ Drills, ☒ Fans, ☐ Firearm Discharge, ☒ Fork lifts, ☒ Gears, ☒ Grinders, ☒ Motors, ☒ Power tools, ☒ Presses/shears, ☒ Saws, ☒ Vehicles, ☐ Airplane, ☒ Vibration, ☐ Other:_____	n/a
☒	Potential (pressure)	☒ Autoclaves, ☒ Boilers, ☐ Coiled springs, ☒ Furnaces, ☒ Gas bottles, ☐ Gas receivers, ☒ Pressure vessels, ☐ Vacuum vessels, ☒ Pressurized system (e.g., air), ☐ Steam header and lines, ☐ Stressed members, ☐ Other:_____	
☒	Potential (height/mass)	☒ Cranes/hoists, ☒ Elevated doors, ☒ Elevated work surfaces, ☐ Elevators, ☐ Lifts, ☒ Loading docks, ☒ Mezzanines, ☒ Floor pits, ☒ Scaffolds and ladders, ☒ Stacked material, ☒ Stairs, ☐ Other:_____	n/a
☒	Internal Flooding Sources	☒ Domestic water, ☒ Fire suppression piping, ☒ Process water, ☐ Other: _____	

Hazard Classification

Select the appropriate hazard level from the dropdown menu:	
Biological	**LSI**
Chemical	**LSI**
Explosive	**LSI**
Radiological materials	**LSI**
Radiation generators	**LSI**
Industrial	**LSI**

Controls for LSI classified facilities: (Low, Moderate and High facility controls are addressed in Tier 2 or Tier 3 SBDs.)

1. Biological operations are designed to meet BSL-2 classification or less. All biological work shall be reviewed via the IWS process and the LBOC prior to starting
2. CMS manages its programmatic inventory of hazardous chemicals to maintain and comply with a Facility Safety Basis Envelope (SBE) of LSI for B241. The LLNL ChemTrack system shall be used to monitor the inventory of primary containers of hazardous chemicals. CMS-332, "Chemical Management Plan" shall be followed to ensure that chemical inventory quantities remain within the authorized facility classification of LSI.
3. There is currently no explosives work in B241. All explosives operations require preparation of an IWS and must be reviewed and authorized before work can begin. Explosives operations shall be managed in accordance with Document 17.1, "Explosives" of the ES&H Manual. No explosives operations above the LSI level will be performed within the facility without formal safety analysis and documentation.
4. CMS manages its programmatic inventory of radiological materials to maintain and comply with a Facility Safety Basis Envelope (SBE) of LSI for B241. A Radioactive Materials Inventory System is maintained by facility management. It is reconciled as frequently as necessary to ensure that the facility radiological inventory remains below the Final RQ limits in 40 CFR 302.4 Appendix B on a cumulative sum-of-the-ratios basis for all isotopes. Inventory reconciliation more frequent than annual shall be performed if the inventory exceeds an administrative control level of 75% of the RQ limits. Prior to receipt, additions are verified not to cause the radiological inventory to exceed the RQ limits. Additions not fully characterized are estimated using field measurements and owner knowledge.
5. Radiation generating device (RGD) operations are defined and limited to ensure that all RGDs operated within B241 remain below the definition of an accelerator as defined in applicable sections of DOE Order 420.2 (LLNL WSS B263).
6. Industrial hazards are managed by facility management at the LSI level.

Other controls?

1. Activation of one or both empty cryogenic tanks located on the south side of the facility will require application of the SBD change control process.
2. To preserve alignment with key assumptions used in developing the Q-values, all toxic gas cylinders not stored within a facility area having one or more barriers to the facility's external airspace shall have a suitable flow restricting device, an installed DOT approved valve cap, or remain within its original DOT approved shipping package.
3. While B241 does not currently meet PC-1 seismic standards, the facility's structural capacity remains sufficiently consistent with the assumptions used in developing the LSI thresholds. No chemical inventory limitations below LSI are being placed upon facilities with structures suitable for occupancy but falling below the PC-1 seismic performance criteria.

List what document(s) through which the controls will be implemented:

Facility Safety Plan CMS Complexes, IWSs, SPs

Table 1: B241 RADIOLOGICAL INVENTORY

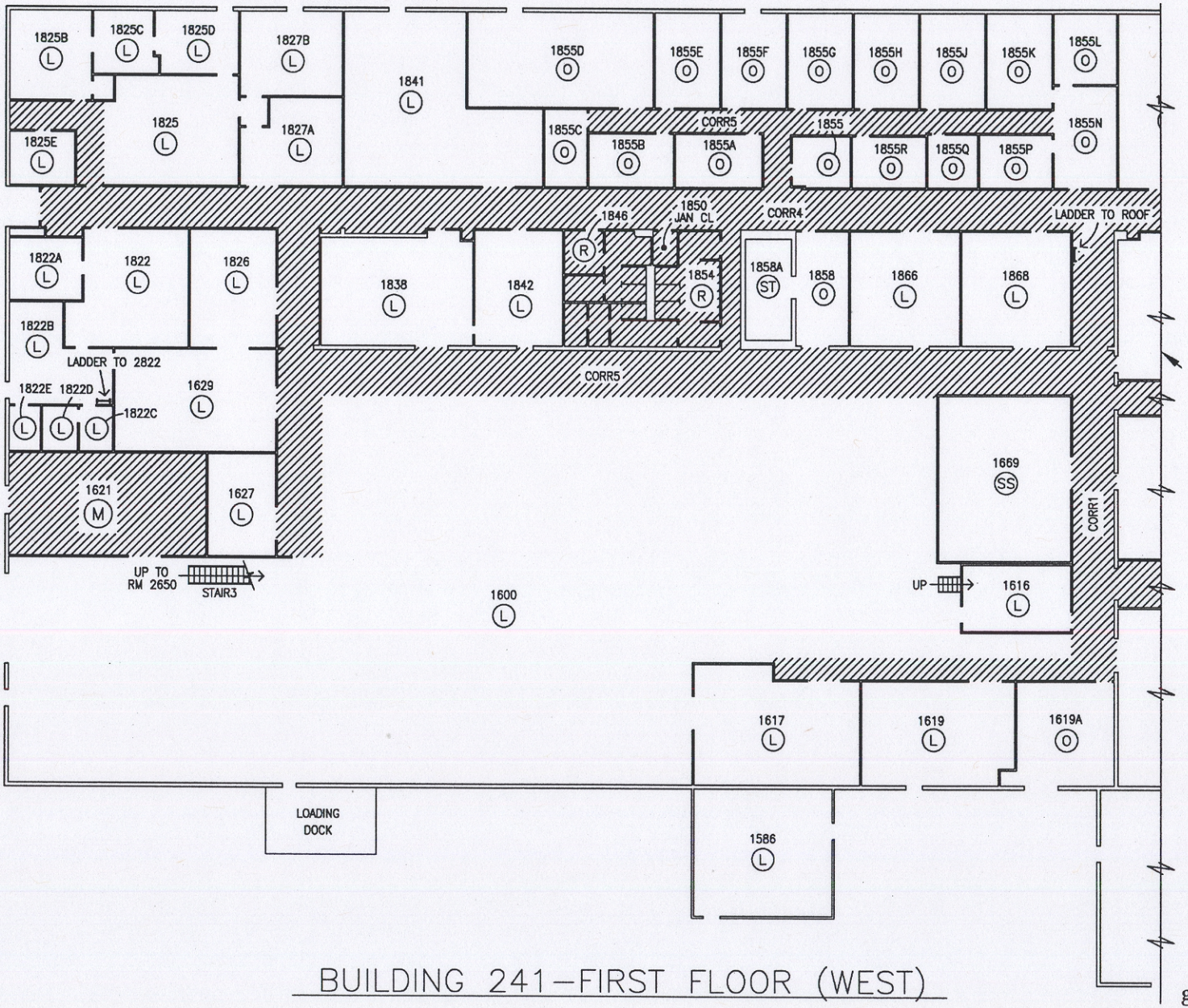
Nuclide	Initial Quantity [activity or mass]	Units	Initial Activity [uCi]	Reference Date	Decay Corrected Activity [uCi]	Final RQ [uCi]	RQ Fraction	Cat III Threshold [uCi]	Cat III Fraction
U-nat	4.04E+04	uCi	4.04E+04	03/07/07	4.04E+04	1E+5	4.04E-01	4.20E+06	9.62E-03
U-235	6.48E+01	uCi	6.48E+01	03/07/07	6.48E+01	1E+5	6.48E-04	4.20E+06	1.54E-05
U-dep	1.97E+03	uCi	1.97E+03	03/07/07	1.97E+03	1E+5	1.97E-02	4.20E+06	4.69E-04
Tc-99	3.4E+05	uCi	3.4E+05	03/07/07	3.4E+05	1E+7	3.4E-02	1.7E+09	2.00E-04

Nuclide	Decay Corrected Activity [uCi]	RQ Fraction	Cat III Fraction
U-nat	4.04E+04	4.04E-01	9.62E-03
U-235	6.48E+01	6.48E-04	1.54E-05
U-dep	1.97E+03	1.97E-02	4.69E-04
Tc-99	3.5E+05	3.5E-02	2.06E-04
Grand Total	3.92E+05	4.59E-01	1.03E-02

No radiological materials are presently excluded from the facility inventory. Exclusion of radiological materials from the facility inventory remains a possibility for future operations.

Actual mix of isotopes may differ from this list but sum-of-fractions will be managed below RQ limit.

Figure 1: B241 FLOOR PLAN - FIRST FLOOR (WEST)



BUILDING 241—FIRST FLOOR (WEST)

Figure 2: B241 FLOOR PLAN – FIRST FLOOR (EAST)

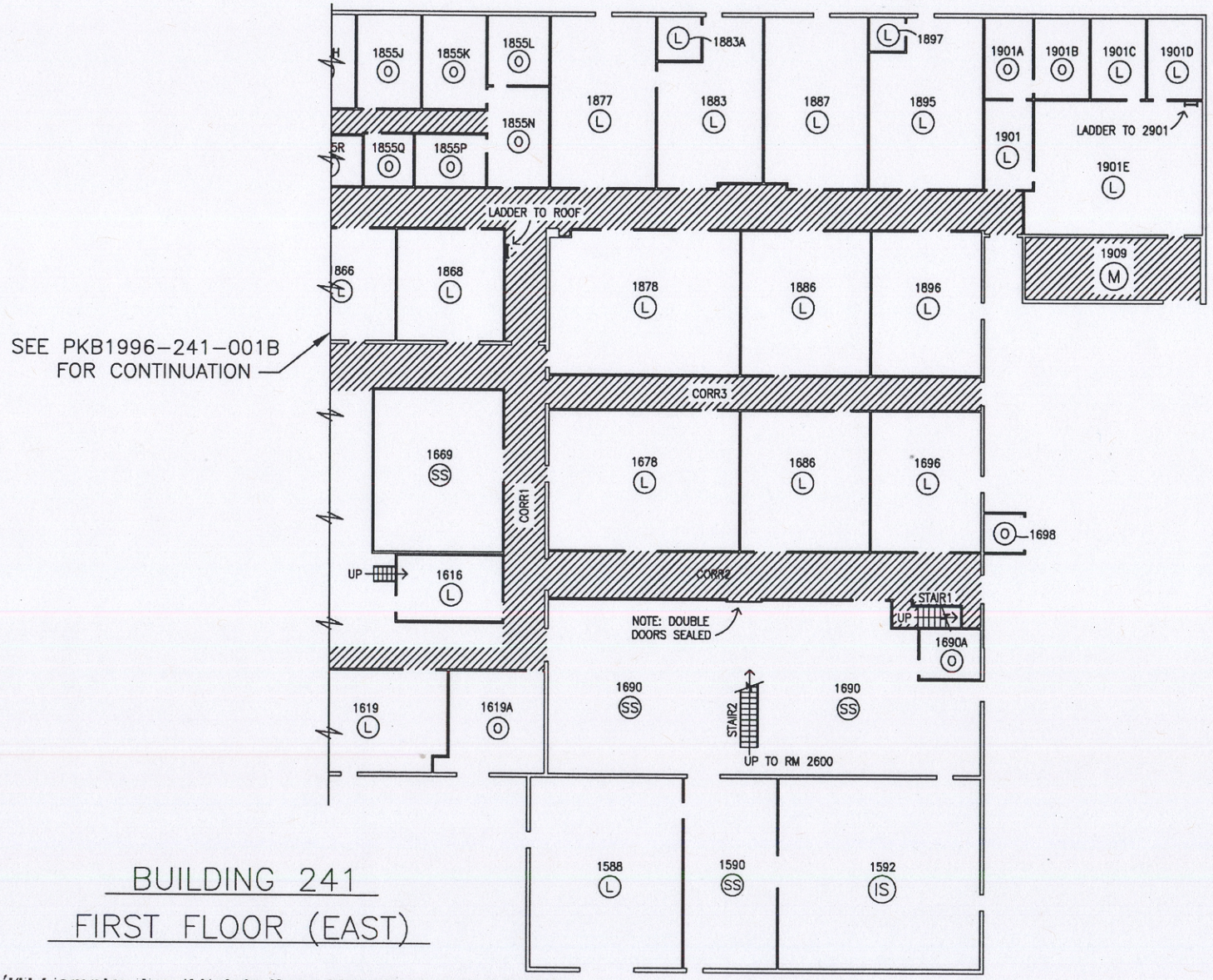
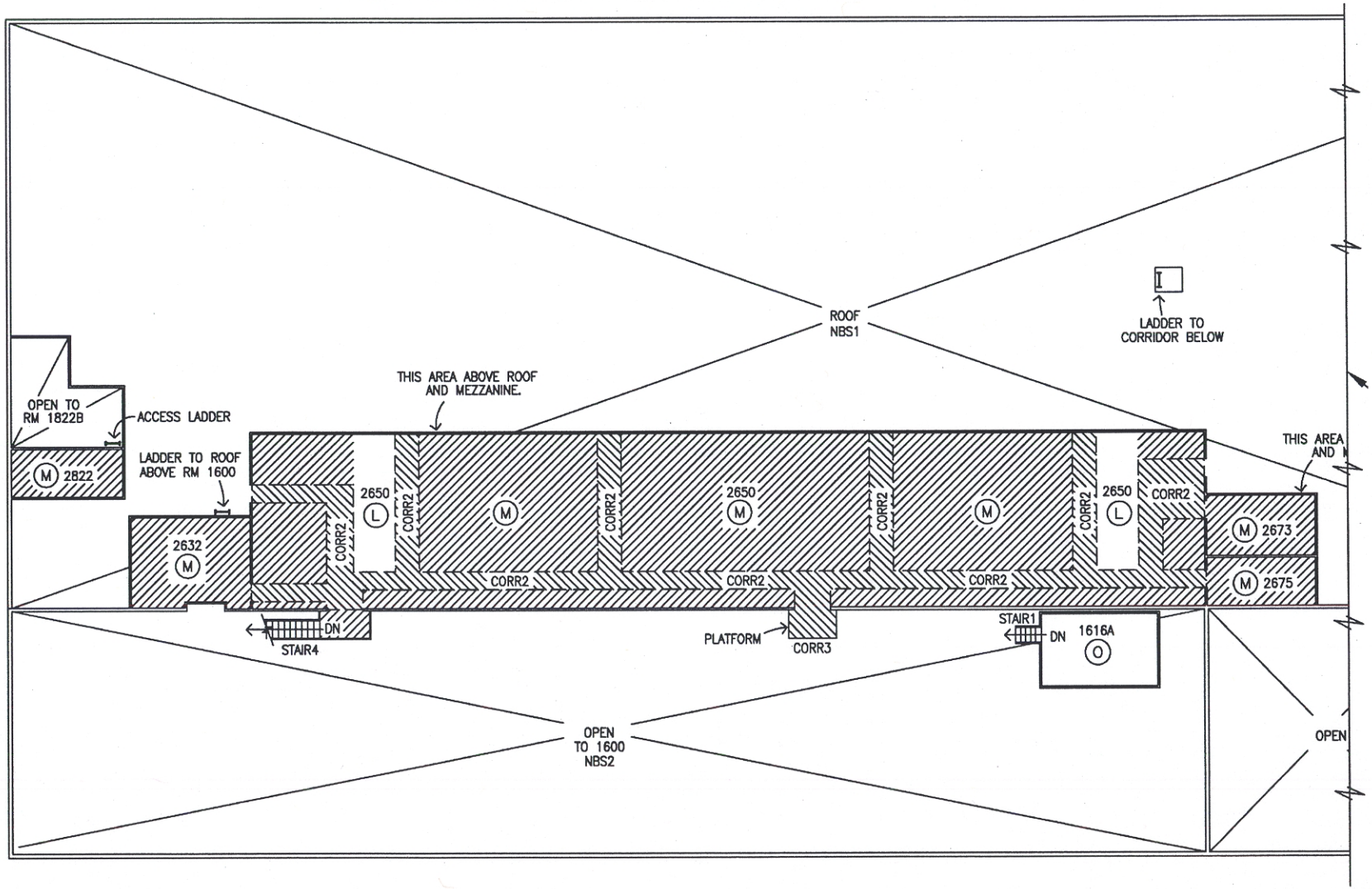


Figure 3: B241 FLOOR PLAN - MEZZANINE (WEST)



BUILDING 241—MEZZANINE (WEST)

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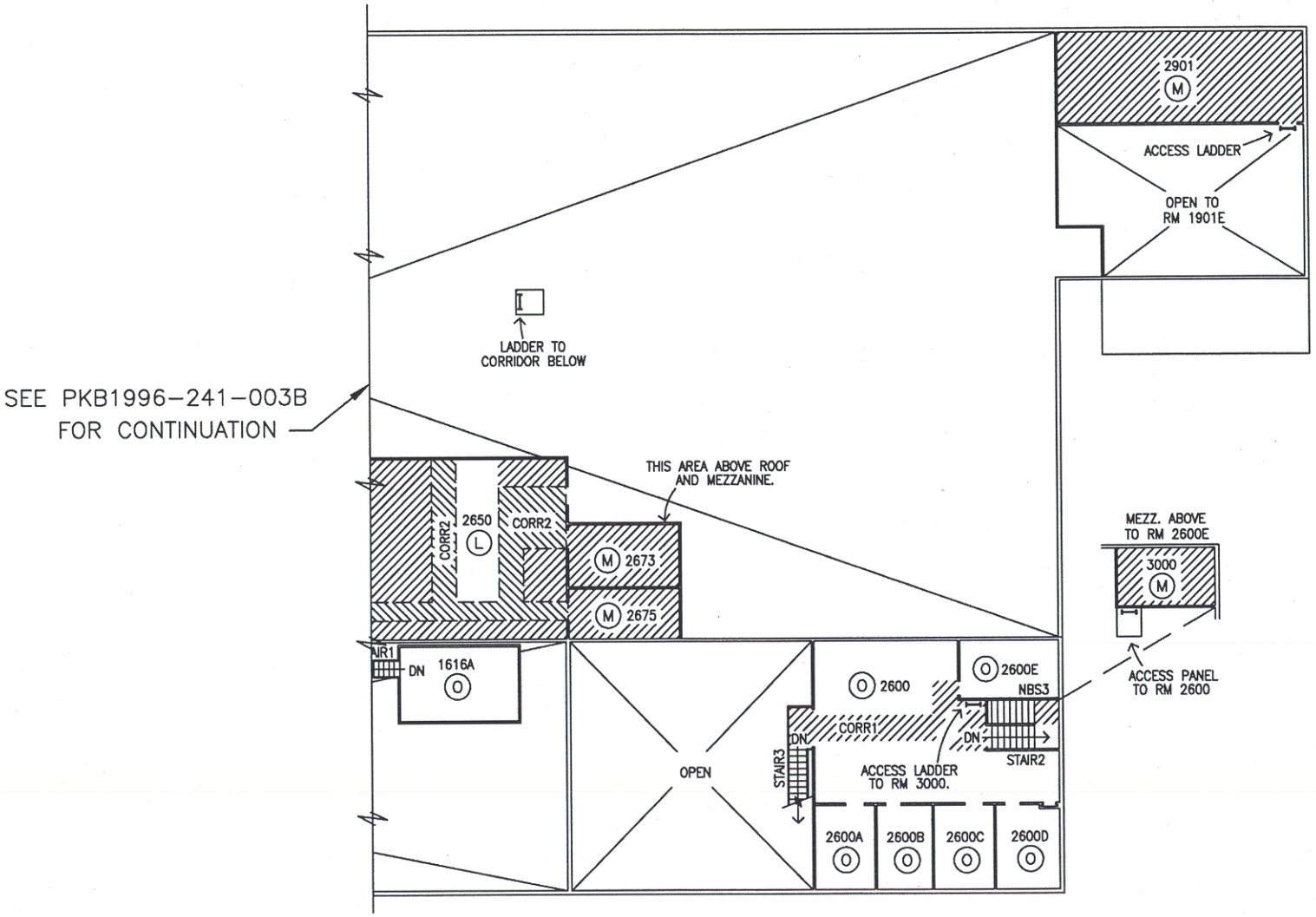
Figure 4: B241 FLOOR PLAN - MEZZANINE (EAST)



BUILDING 241-MEZZANINE (EAST)